United States Navy
Radio Frequency Identification (RFID) Implementation Plan

8 December 2005

This page intentionally left blank.

TABLE OF CONTENTS

REFERENCES

(a)   USD (AT&L) Memo of 30 July 2004, Subj: Radio Frequency Identification (RFID) Policy

(b)   OPNAV Memo Ser N413T/4U737251 dated 22 July 2004, Subj: Navy Radio Frequency Identification (RFID)

(c)   CNO Memo 4400 Ser N413T/3U572723 of 19 Dec 03, Subj: Navy Radio Frequency Identification (RFID) Implementation Plan

(d)   USD (L&MR) Memo of 23 September 2005, Subj: Planning For Radio Frequency Identification (RFID) Implementation

(e)   OPNAVINST 4441.12C, Subj: Retail Supply Support of Naval Activities and Operating Forces, of 26 October 1999

1.   Overview

1.1   Introduction

The Department of Defense (DoD) promulgated Radio Frequency Identification (RFID) Policy on 30 July 2004, reference (a), and directed each of the DoD Components to prepare supporting plans that "encompass both active and passive RFID technology in a cohesive environment to support the DoD vision." Reference (b) outlined the Navy's position and comments on this policy.

This is the third version in what will be a continuing series of updates to the Navy RFID Implementation Plan. It conforms to the guidance provided in reference (a) and details Navy implementation priorities and schedule. It is the single authoritative, guiding document for Navy RFID efforts. The plan will continue to be updated periodically as required to ensure continued alignment with DoD policy and to provide a current plan of reference.

Current DoD RFID policy focuses on In-Transit Visibility (ITV) support of the Combatant Commanders (COCOMs) as the primary application of active RFID (aRFID), and DoD supply management applications for passive RFID (pRFID). It is expected that the DoD RFID policy will be refined over time as the technology improves, the associated standards become institutionalized, and the affected business processes evolve to benefit from capabilities inherent in RFID.

This plan provides overarching guidance while addressing the two distinct, but interrelated, application subcategories: (1) Active RFID, (2) Passive RFID. There are ashore and afloat aspects to each of these. Implementation actions will be taken to enable Navy activities that include each of the major nodes within the Navy's supply chain. Additionally, applicable Automated Information Systems (AISs) must be systematically RFID-enabled to ensure successful integration of the technology.

The Chief of Naval Operations, Director, Supply, Ordnance and Logistics Operations Division (OPNAV N41) is the functional sponsor for Navy Automatic Identification Technology (AIT), which includes RFID. The OPNAV N41 action officer and point of contact for AIT/RFID is N413T.

By reference (c), OPNAV N41 directed the Naval Supply Systems Command (NAVSUP) to develop and execute this plan. The Navy AIT Program Office, resident at NAVSUP, will work with the designated AIT representatives within the 35 Echelon II commands and other key claimants who have related implementation responsibilities. Comments or recommendations should be provided to the Navy AIT Program Office, NAVSUP Code AIT-1.

The Deputy Under Secretary of the Navy, Logistics and Material Readiness (DUSD (L&MR)) in reference (d) directed the expansion of all DoD Services and the Defense Logistics Agency (DLA) RFID Implementation Plans to include additional information. This revised Navy RFID Implementation Plan complies with the guidance in reference (d).

RFID remains part of a larger suite of AIT based media (e.g., barcodes and contact memory buttons) that will continue to be leveraged where appropriate across all logistics functional areas. This includes, but is not limited to, supply, transportation, maintenance/repair, reverse logistics (retrograde), quality assurance, and disposal.

1.2   DoD RFID Policy

Reference (a) finalized policy for the use of RFID within the DoD and initiated a strategy to take maximum advantage of the inherent life-cycle asset management efficiencies that can be realized with the integration of RFID throughout DoD. Each Component was tasked to generate its plan to comply with the DoD RFID policy.

The DoD policy has three parts. The first part calls for immediate implementation of the aRFID data-rich tag to meet COCOM ITV requirements for layer 4 container and palletized 463L pallets moving OCONUS. The second calls for DoD to be an adopter of innovative RFID technology, notably the pRFID tag, for use at the case/unit pack level to optimize the supply chain. The third is the Supplier Implementation Plan that describes the parameters and the schedule for DoD suppliers to attach pRFID tags to material to be delivered and how this will be phased in by procurement method, class/commodity, location and packaging layer.

For further information, visit the DoD RFID web site at http://www.acq.osd.mil/log/rfid/index.html.

1.3   Navy RFID Approach

A key concept for the Navy RFID implementation is "central management" of the associated effort and expenditure of Navy resources for maintaining the architecture. AIT standards and equipment should be approved centrally for Navy use, and specifically, the initial outfitting for RFID. In this regard, RFID hardware and unique software requirements shall be identified by all commands, and then aggregated centrally for budget purposes and execution of initial procurements. Thus, individual commands will not be asked to initially outfit RFID capability, but will be responsible for AIS life cycle management and replacement. The Navy AIT Program Office will be responsible for consolidating budget requirements for subsequent upgrades to AIT equipment and the maintenance of the existing aRFID system, and submitting to NAVSUP for budget submission.

Another major planning concept is that of "phased implementation." Selected systems, nodes, and platforms will be prioritized to maximize utility, and to minimize implementation, investment and operational risk during implementation.

The Navy's position as stated in reference (b) is that Return On Investment (ROI), specifically cost savings, and contribution to readiness are paramount investment considerations.

Active RFID: The Navy fully supports COCOM RFID active-tag requirements for ITV. We will continue to sustain efforts in this area, but also seek to minimize investment in

permanent infrastructure over and above COCOM ITV requirements unless a positive ROI can be realized for the Navy. The use of mobile equipment to be installed as needed during contingency operations is preferred. Additionally, the Navy Total Asset Visibility (TAV) Project Office continues to search for ITV gaps and may identify future investment requirements.

Passive RFID: The Navy completed a Business Case Analysis (BCA) of pRFID to facilitate decision-making with respect to future RFID implementation. Navy seeks to implement pRFID to enable the supply chain in areas that provide the highest ROI and cost savings.

The BCA findings using the best data available indicated that further study was required on the use of pRFID to enable global fleet freight warehouse and pier side operations. If the cost estimates used in the analysis proved to be accurate, the best break-even that can be obtained will be in 5 years for ashore implementations. However, from this study no discernable ROI will be obtained for afloat implementations.

The Navy will need to complete the on going "focused implementation" at the Trident Refit Facility (TRF) at Bangor, Washington in order to substantiate the BCA results. The initiative is called the Bangor RFID Evaluation (BRE). It is expected that the real world experience gained from the Bangor initiative will also validate and enhance the preliminary ROI calculations developed for this portion of the Navy supply chain.

This plan does not include United States Marine Corps (USMC) unique needs. They will be addressed in a separate USMC RFID Implementation Plan. However, as both RFID implementation plans are reviewed and areas of necessary Navy-USMC coordination/integration are identified, the respective plans will be updated. AIT/RFID has been identified as a Naval Logistics Integration (NLI) Initiative.

1.4   Navy RFID Plan Goals and Objectives

The primary goal of this document is to implement reference (a) in Navy for both aRFID and pRFID.

The overall objectives of the Navy RFID Implementation Plan include:

- Develop and initiate RFID implementations that add value to Navy logistics processes in a standard fashion, balancing effectiveness and efficiency. Focus will be on ROI/cost savings and contribution to readiness.

- Integrate RFID into all applicable logistics processes and related AISs.

- Achieve TAV throughout the entire supply chain using RFID as an enabler.

- Focus on RFID implementations that will enhance supply processes (e.g. receipt, stow, inventory and issue).

1.5   Navy RFID Challenges

Although the Navy supports the vision and guidance provided in current DoD RFID Policy, there are certain prerequisites that must be fulfilled for any implementation of RFID to be fully successful. These are strategic issues that are still not resolved to date:

a. <u>Funding</u>: The DoD RFID policy, specifically regarding passive tagging, did not allow for Services to budget for, and implement within the stated timeline due to the budgetary process schedule and the two-year POM cycle. Additionally, overall funding constraints will challenge the completion of required modifications to designated AISs.

b. <u>Technology</u>: There remain a number of significant, unresolved RFID technology issues. Policy and guidance addressing data format (e.g., MH10 format for active tags), data (e.g. Unique Identification versus Electronic Product Code constructs), and business process issues in the DoD RFID CONOPS need to continue to be worked to support a standard implementation across DoD. Additionally, there are a number of significant Information Technology (IT) systems integration issues to resolve.

c. <u>Regulatory</u>: Compliance with regulations and other requirements that challenge RFID implementation such as wireless, Hazards of Electromagnetic Radiation to Ordnance (HERO) certification, Federal Information Processing Standards (FIPS 140-2), and other security issues, such as the Navy and Marine Corps Intranet (NMCI) network restrictions, have not yet been fully addressed. The significant increase in ambient RF sources aboard ship, the potential unique interactions between these sources and the pRFID reader/interrogators, as well as the increased possibility of mutual interference with sensitive ship systems, are causes for concern. Hence, the need to properly explore these unknown effects will require that shipboard use of pRFID systems be implemented more cautiously, and therefore, more slowly than ashore implementations.

d. <u>Return on Investment</u>: RFID-enabling the Navy supply chain must be in areas that provide value and lead to improvements in productivity and cost savings. A key objective of this plan is to outline a phased implementation that adds value to Navy readiness. ROI and specific areas to apply investment still need to be refined.

Some technical, AIS integration, and cost-benefit issues still remain. The Navy AIT Program Office is assisting OPNAV N41, and participating in OSD Supply Chain Integration and AIT Offices' Integrated Process Teams (IPTs) to resolve these issues and determine appropriate courses of action.

The Bangor RFID Evaluation, now underway, will significantly aid in verifying the ROI estimates and preparation of future budgetary submissions.

1.6   RFID Planning Factors

Other initiatives are occurring within DoD that will influence the manner in which RFID technology will be deployed and the supporting logistics AISs are modified.

Unique Identification (UID): RFID utilization must accommodate the new DoD RFID policy for UID that will facilitate the identification of material across all classes of supply. However, this Navy RFID Implementation Plan pertains only to RFID implementation and not the challenges of integrating UID into the business processes within the Navy Supply Chain. The AIS modifications under this plan are limited to what is necessary for RFID enablement and only apply to systems that are required to read or write RFID tags. Hence, business process changes to accommodate UID implementation are not part of the costs and implementation processes described within this plan.

For further information, visit the DoD UID web site at http://www.acq.osd.mil/dpap/UID/.

Electronic Product Code (ePC): The ePC is a set of data specifications (different than the current UID specification and constructs) that have been developed by a consortium of academic and commercial organizations for the purpose of creating an identification system that could be used worldwide. It is an emerging standard that uniquely identifies a specific, individual commercial item in the supply chain, not just a general category like a stock number or part number. The ePC is stored on a pRFID tag, which combines a silicon chip and an antenna. Once the ePC is retrieved from the tag it can be associated with dynamic data such as from where an item originated or the date of its production. Much like a Global Trade Item Number (GTIN) or Vehicle Identification Number (VIN), the ePC is the key that unlocks the power of the information systems that are part of the commercial ePC Global Network. DoD intends to incorporate the DoD UID construct as a variant of the ePC used by the commercial vendors who will place ePC-based pRFID tags on material and equipment procured by the DoD.

For further information, visit the ePC Global web site at http://www.epcglobalinc.org.

Enterprise Resource Planning (ERP): ERP is a business transformation. In support of CNO's Sea Enterprise strategy of Sea Power 21, the Navy ERP Program is a key enabler to achieving unified and integrated business processes and AISs to lower overall maintenance costs, improve management decision making, move more maintenance work ashore, improve resource management, and enhance combat readiness. It uses a unique architecture provided by the SAP application that is being systematically adapted across Navy business processes. As obsolescent legacy AISs are identified and subsumed into the ERP system, the legacy systems will be turned off. Hence, prudent planning and execution of the Navy's RFID-enablement of its legacy AISs is essential.

For further information, visit the Navy ERP web site at http://www.erp.navy.mil/.

1.7   RFID Deployment Issues

RFID as an AIT media is not fully mature at this point. However, within DoD, aRFID has now established de facto standards and operates with a high degree of performance reliability. With the advent of the widely accepted Level 1, Generation 2 pRFID tag specification, which is soon to be established as an ISO standard, pRFID will also achieve a

major milestone towards universal acceptance.

Still there are few experts and relatively little pRFID deployment experience compared with bar codes deployments. Passive RFID products are not generalized to allow for a "one-size-fits-all" solution. To achieve optimization, a family of tags with different frequencies, antenna types, packaging designs, and other variations will be necessary to adapt pRFID to each of the military material configurations, processes, and environments. Lastly, to take full advantage of the potential benefits of pRFID, business processes will need to be re-engineered.

1.8   Passive RFID Business Case

Since there remain substantial technological and design problems and uncertainties surrounding pRFID, cost estimates for large-scale implementations cannot be ascertained with the desired level of accuracy. To date, the Navy has not been able to identify large-scale adoptions of pRFID for which detailed quantitative performance results are available. There is consequently only a small amount of hard data on which to base cost and benefit estimates, except for isolated instances involving relatively small scales. Also, there are very few working examples of pRFID applications in a Navy environment, and these are being evaluated.

Evaluation of the benefits that the Navy could expect from widespread adoption of pRFID is difficult. While it is possible to qualitatively describe the kinds of benefits that the Navy could expect, quantifying them is much harder. During this stage of pRFID development and implementation, it will remain a challenge to fully quantify the cost/benefit, or document a business case, to support the requisite funding requirements.

Nonetheless, prudent investment decisions must be made with respect to pRFID and any potential contribution to readiness. The best data available must continue to be researched, acquired, and evaluated.

In early 2005, the Navy conducted a comprehensive BCA for its pRFID implementation in order to support the best budget allocation decision possible under these circumstances. To aid in this effort, the Navy relied on elements of the DoD RFID costing model for key cost factors and projections, and those recently developed by Navy AIT analysts.

The BCA found no compelling case supporting wide deployment of pRFID in the Navy at this time. The current state of pRFID technology remains substantially untested in the forward military environment and aboard ship, and the required infrastructure to effectively collect, communicate and integrate the captured data into required automated information systems is not yet matured. The largest benefits will accrue as a function of the degree to which the business processes within the Navy's value chain can be optimized first, and then enhanced by the integration of proven pRFID technology when ready. Navy intends to take a measured approach to deploying pRFID technology, targeting those applications that achieve a positive ROI.

1.9 Measuring Progress

There are two layers of metrics that need to be applied to properly measure the achievement of the Navy's goals: (1) success of plan implementation itself and (2) the expected improvements (contribution to readiness) to be achieved within the supply chain functions. These are in addition to any metrics pursued by DoD.

When directed by NAVSUP, Echelon II commands shall report plan implementation progress measurements semiannually to the Navy AIT Program Office. Detailed reporting guidance is under development. The criteria are listed below.

Plan Implementation:
- Number of sites RFID-enabled versus planned
- Number of AIS connections established versus planned
- Actual versus planned implementation cost
- Level of success in receiving requested funding resources through the POM or special funding relative to the planned expenditures

Expected Improvements:
- Cost savings contributing to Sea Enterprise
- Quantitative improvement in supply chain functions, Navy-wide
- Quantitative improvement in ITV, DoD-wide
- Increase in percentage of shipments received that were properly tagged thus decreasing touch labor
- Improved inventory accuracy and traceability
- Increase in effective tag read rate to goal of 100% at each node
- Increase in percentage of data captured via RFID tag readers/interrogators that was automatically reported to the organization's accountable inventory record
- Inventory reduction and improved supply chain efficiency

Measurement of the improvements in the Navy's supply chain as a result of the implementation of this plan will require a before implementation "as is" assessment of the current effectiveness levels. Related assessments are routinely performed and reported as directed by reference (e).

These assessments include measurements of the following metrics: Response to Failure (RTF), Average Customer Wait Time (ACWT), warehouse refusal rates, and Logistics Response Time (LRT). Additionally, gaps or data errors/deficiencies at transportation nodes or assembly areas and condition-based maintenance related measurements might be subsequently evaluated using the information that can be readily collected from RFID-based systems.

Additional measurement methodologies will be reviewed by the Navy AIT Program Office and adapted for Navy use as appropriate.

It is also prudent to measure DoD AIT-related policy impacts. Hence, the DoD Logistics

AIT Office, has adopted a "Balanced Scorecard" methodology, as a means to measure key performance improvements DoD-wide. Navy metrics will relate to level 3 and 4 metrics of the DoD Logistics Balanced Scorecard (BSC).

1.10   DOTMLPF Considerations

Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities (DOTMLPF) related considerations not specifically addressed in other sections of this plan are included in this section. Other than these, there are no additional significant DOTMLPF considerations to be addressed at this time.

1. *Doctrine*

The Navy AIT Program Office will centrally manage, standardize, and submit budget requirements to NAVSUP for budget submission for broad implementations of AIT within the Navy. Key references include: OPNAV Instruction 4441.12C, Subj: "Retail Supply Support of Naval Activities and Operating Forces"; NAVSUP P-485, "Naval Supply Procedures"; NAVSUP 723, "Navy Integrity Procedures"; applicable Fleet instructions; and numerous other directives and publications produced by Navy Echelon II organizations.

2. *Organization*

OPNAV N41 is the program resource sponsor for the implementation of Navy AIT. NAVSUP Headquarters (HQ) is responsible for the execution of logistics policy as the Logistics Support Authority (LSA) for the Navy. The Navy AIT Program Office manages, monitors and evaluates the Navy's execution of all AIT initiatives and provide technical guidance for the development and implementation of AIT within the Navy. This includes the management of RFID and specifically the central management of initial RFID capability outfitting.

Echelon II commands and other participants in the implementation of RFID in the Navy will coordinate with the Navy AIT Program Office when taking significant action in response to the plan requirements, particularly when developing or upgrading AISs which will be RFID-enabled, to ensure compatibility, interchangeability, interoperability and sustainability.

3. *Training*

The DoD Logistics AIT Office has been tasked to prepare a multi-level RFID education and training plan for promulgation to all components and agencies. When this package is distributed, the Navy AIT Program Office will review and tailor as necessary to address Navy-unique operating environments and organizational procedures. Included in this effort will be recommendations to OPNAV N41 for: (1) the establishment of a formal curriculum to be developed for inclusion in each appropriate Navy school course, and (2) on-the-job training on RFID, other AIT media and equipment, as well as the operation of associated AISs that will be modified to accommodate AIT devices and their data input.

Specific to the outfitting of non-self deployers, the Navy focus will be on supplying Training Guides. These Training Guides will provide information on the use of aRFID hardware/software. Also, the TC-AIMS II curriculum will be expanded to include an aRFID module.

4. Material

Compatible aRFID tags and associated equipment approved for use in supporting COCOM ITV requirements will be used exclusively. Other aRFID and supporting equipment on the DoD RFID contract (DoD RFID II Contract DABL01-03-D-1002) will be used whenever possible and as directed by COCOMs' Policy. The Army PM J-AIT has recently awarded Blanket Purchase Agreements (BPAs) to facilitate the procurement of the various types of authorized pRFID tags and equipment.

1.11   GPRA Considerations

The first step required to integrate the Department-wide implementation of RFID is to integrate the individual RFID implementation plans from the U. S. Transportation Command (USTRANSCOM), the Military and the Defense Logistics Agency (DLA) into an integrated plan for Department-wide implementation of RFID.

However, before this can be done, each plan must be in compliance with the Government Performance and Results Act (GPRA) of 1993. Throughout the Navy RFID Implementation Plan, the Navy's intentions and methods are outlined in order to help the Department of the Navy respond to DoD, and subsequently OMB GPRA information requirements.

GPRA identifies eight key strategic management principles:

1) General and Long-Term (LT) Goals and Objectives

2) Description of Specific Actions to Support LT Goals and Objectives

2) Performance Measures

3) Key External Factors

5) Detailed Schedules and Milestones for Meeting Deadlines (five years minimum)

6) Resources and Annual Cost Estimates

7) Accountability (who is leading this effort)

8) Evaluation Plan to Monitor Success and Adjust Overall Plans

1. General and Long-Term (LT) Goals and Objectives

As identified in Section 1.4 of this plan, the primary goal of this document is to implement reference (a) in Navy for both aRFID and pRFID. This includes the requirements to "immediately implement" aRFID and incrementally implement pRFID throughout the Navy enterprise in accordance with the schedule provided.

As listed in Section 1.4 of this plan, the objectives of the Navy RFID initiative include the requirement to focus on the ROI/cost savings and contribution to readiness, the integration of logistics processes and related AISs, the enterprise-wide achievement of Total Asset Visibility (TAV), and the requirement to enhance applicable supply processes.

2. Description of Specific Actions to Support LT Goals and Objectives

As listed in Appendix A of this plan, specific actions have been identified and responsibilities assigned in order to ensure that the necessary support is provided to achieve the stated Navy RFID initiative goals and objectives.

3. Performance Measures

As identified in Section 1.9, Navy RFID implementation methodology is based on where investment makes business sense. The listed performance measures are directed toward the effectiveness of the planning itself, as well as the expected improvements in Navy logistics processes.

The Navy AIT Program Office is working with component activities to identify additional baseline metrics and performance measures to support "as is" and "to be" analysis in order to determine compelling functional and business process areas for aRFID and pRFID implementation.

4. Key External Factors

As identified in Sections 1.5, Navy RFID Challenges, and Section 1.6, RFID Planning Factors, there are several issues that individually, or collectively, will challenge the successful implementation of RFID and the adherence to cost, time, and schedule estimations.

5. Detailed Schedules and Milestones for Meeting Deadlines (five years minimum)

As identified in Section 3.2, the Navy AIT Program Office is responsible for execution of the Navy RFID Implementation Plan. Although the plan is aligned with the initial schedule for implementation described in reference (a), significant milestones that are beyond the Navy's control are trending the schedule to the right more and more. These DoD milestone delays and the associated budgetary impacts are forcing a reconsideration of the current OSD implementation schedule, which will subsequently drive the Navy implementation schedule and

associated milestones. Tables 2.2 for aRFID, 3.5 for pRFID ashore, and 3.6 for pRFID afloat show the year in which each major implementation phase will take place.

As soon as possible, the Navy AIT Program Office will develop, maintain, and routinely update cost, time, and schedule information in order to monitor plan compliance. Milestone briefings will be provided to OPNAV N41 as required, but not less than annually to coincide with budget development timeframes. However, due to the volatility of such schedules, the detailed plan of actions and milestones (POA&M) will be maintained outside of this document.

6. *Resources and Annual Cost Estimates*

As identified in Section 3.1, OPNAV N41 is the resource sponsor for the Navy AIT Program Office and is responsible for the central management and funding of Navy RFID requirements. RFID will be resourced in accordance with funding priorities within the Navy and quantifiable ROI and BCA analysis. Annual POM/PR cost estimates will be developed by the Navy AIT Program Office and submitted to OPNAV N41 for review.

7. *Accountability (Who is leading this effort)*

As identified in Section 3.2, the Navy AIT Program Office at NAVSUP is accountable to OPNAV N41 for the execution of the Plan. COMNAVSUPSYSCOM is the Logistics Support Authority (LSA) within the Navy. The LSA structure and organization provides accountability and reporting mechanisms to support Plan implementation.

8. *Evaluation Plan to Monitor Success and Adjust Overall Plans*

The Navy AIT Program Office will supply resources to continuously evaluate, monitor, and adjust the Navy RFID Implementation Plan accordingly. The Navy recognizes RFID as a "disruptive" technology that transforms business processes and associated systems in support of Logistic Transformation and Future Acquisition efforts. The Navy AIT Program Office will monitor Plan implementation under one of four categories, 1) aRFID, 2) pRFID ashore, and 3) pRFID afloat, and 4) Container initiatives, involving RFID applications in Layer 4 containers that move within ashore and afloat platforms which may include some combination of active tags, active tags with sensors, and/or passive tags.

2.0   Navy Active RFID Implementation Plan

2.1   Program of Record

The active tag requirement to support COCOM ITV was directed as an immediate one per DoD RFID policy, and for that reason was not included in the Navy's POM 06 submission. However, Navy has invested a total of $2.9M from FY03 thru FY05 to support identified Combatant Command (COCOM) aRFID requirements. Full investment outlined in this plan will cover RFID requirements for non-self deploying units operating in any COCOM's Area of Responsibility (AOR), prepositioned material, Navy Exchange, aircraft engine containers, and other areas addressed under DoD RFID policy. Unfunded aRFID requirements will be addressed in POM08.

The Navy aRFID plan was first developed and provided to Joint Staff J4 in October 2003 and has evolved since that time to cover emerging Navy active tagging requirements for high value Layer 4 containers stored or in-transit worldwide. The requirements summarized in Table 2.1 represent the initial outfitting and life cycle costs to support both COCOM ITV and DoD/Navy RFID policy requirements. Program Decision Memorandum 2 (PDM2) includes $7.46M for Navy investment to meet COCOM ITV requirements specifically. This investment will not fully fund all currently identified COCOM requirements.

The plan shown below highlights the ordnance requirement, which is based on a six-year roll out beginning in FY08. Outfitting of all other aRFID requirements are completed by the end of FY08 and then incur life cycle costs each year thereafter. The total aRFID requirement over FY06-FY13 equals $42.5M. The total aRFID POM08 requirement is $35.0M.

Table 2.1 – Navy Active RFID Funding Plan ($M)

Active	2006	2007	2008	2009	2010	2011	2012	2013	Total
PDM 2	$4.5	$0.6	$0.6	$0.6	$0.6	$0.6			$7.5
Ordnance	$0.0	$0.0	$7.3	$6.8	$5.0	$3.4	$3.9	$4.3	$30.7
All others	$4.5	$0.6	$3.7	$0.6	$0.6	$0.6	$0.6	$0.6	$11.8
Total Requirement	**$4.5**	**$0.6**	**$11.0**	**$7.4**	**$5.6**	**$4.0**	**$4.5**	**$4.9**	**$42.5**
Cum POM08 Requirement			$10.4	$17.2	$22.2	$25.6	$30.1	$35.0	

Table 2.2, "Navy Active RFID Requirements Summary" appears at the end of this Active RFID Implementation Plan section. The RFID capability categories identified for funding are listed. It depicts the initial outfitting, ITV interoperability, and life cycle costs to fully meet COCOM ITV and DoD/Navy RFID policy requirements.

2.2   Execution

NAVSUP HQ prepared, and is responsible for the execution of this plan. Table 2.2 summarizes the known Navy active tag requirements for Fleet and Components, Navy Primary Non-self Deployers, Strategic Navy Nodes, Maritime Preposition Force (MPF), and Other Navy Requirements. Implementation in these areas is detailed below.

1. *Outfit Fleets and Component Commands*

This effort will ensure Fleet and component commands have deployable RFID capability to support contingencies and DoD RFID policy. The plan includes the outfitting of three Early Entry Deployment Support Kits (EEDSKs), plus 'one set' (1200) active, data rich SAVI 654 tags to Commander, Fleet Forces Command (CFFC) for unplanned Fleet requirements. An additional three kits each will be provided to Forward Logistics Sites (FLSs) at CENTCOM, EUCOM, and PACOM. Finally, three kits consisting of EEDSKs and Portable Deployment Kits (PDKs) will be available as 'standby deployable assets' under the control of the Naval Operational Logistics Support Center (NOLSC). A total of 15 deployable kits will be provided. Outfitting, setup, and training are included in the cost estimates.

NOLSC/NAVSUP will liaison with Hardware Systems Commands (HSCs), PM J-AIT, supporting vendors and activities/units to coordinate efforts to equip in support of the ITV effort. The NOLSC POC is Code N43. Phone number is (757) 443-5404.

Plans are being made to outfit and deploy additional units on demand. Many systems require funding to enable interoperability with ITV/Global Transportation Network (GTN) feeder systems in place (included in projected cost). These efforts ensure full support of DOD RFID policy through the FYDP.

2. *Outfit Non-self Deploying Units*

Naval Facilities Expeditionary Logistics Center (NFELC) is responsible for the acquisition, management and delivery of Naval Construction Force (NCF) supplies, equipment and facilities to deployable Navy units providing theater combat Level III construction and contingency support. NFELC maintains a detailed aRFID implementation plan for their units.

Seabees/Naval Construction (NC) Civil Engineering Support Equipment (CESE), Naval Mobile Construction Battalions (NMCBs), Naval Construction Force Support Unit (NCFSU), Underwater Construction Teams (UCTs), Construction Battalion Maintenance Unit (CBMU), Regimental TOAs, Naval Expeditionary Logistics Support Force (NAVELSF), NAVSPECWARCOM, Fleet Hospital Support Office as well as other, smaller units all use TC-

AIMS II to effect deployment and redeployment shipping. NOLSC is in the process of outfitting all Navy TC-AIMS II users with aRFID capabilities. This capability also covers MPF containers and CESE. Major units, accounting for roughly 85% of Navy Unit Move cargo volumes are scheduled to be outfitted FY06. Remaining units will be outfitted in FY08. NOLSC expects to create a contingency capability to cover small units that lack the ability to maintain proficiency in aRFID.

Detailed equipment lists are being maintained by NOLSC as site surveys are completed and units outfitted.

3. *Outfit Strategic Navy Nodes*

Major Navy nodes that ship Layer 4 containers Outside Continental United States (OCONUS) will have read/write and/or interrogation capability as needed. Some of these activities will be provided aRFID capability through the deployment of the Advance Manifest System-Tactical (AMS-Tac). These nodes include but are not limited to:

Naval Air Stations, Naval Aviation Depots, Weapons Magazines, and other activities worldwide to provide visibility of Layer 4 containers used to move aircraft engines internationally. Navy AIT Program Office is maintaining a detailed list of activities as they are outfitted.

4. *Outfit Maritime Preposition Force*

As an NLI initiative, the Navy-USMC AIT Integration Group approved a plan for the USMC to execute all MPF tagging requirements regardless of unit/material Service ownership. This requirement has been greatly reduced, as all Major Navy units will be tagging containers prior to movement to CONUS ports of embarkation. This ensures prepositioned materials, and other unit equipment onboard MPF are tagged in a systematic manner, and synchronized with the USMC rotation process.

5. *Outfit Other Navy Requirements*

- **Engine Containers/Dynamic Components**

Layer 4 engine/module containers are shipped to a number of OCONUS sites and self-deploying and non-self deploying units. The Navy plans to apply active tags to all Layer 4 containers. The Navy ships an estimated 3,200 containers/engines between OCONUS sites a year.

NAVAIRSYSCOM/NAVICP have determined there may exist a continual humidity-monitoring requirement for these high value components. The Navy plans to test the use of sensor-based RFID tagging infrastructure to monitor location (in-storage and in-transit) and environmental conditions of these containers and assets. To maintain the most efficient level of container inventories, Navy does not differentiate between OCONUS and CONUS container pools. This means all containers will move internationally. Navy intends to affix tags in a

permanent configuration on these containers. The goal is to leverage the infrastructure built to support COCOM tagging requirements to track containers/assets when in storage as well as in-transit between CONUS locations. The estimate for the number of containers to be tagged is 8,000 containers. It is estimated that a requirement of up to $1M for tags (depending on type tag selected and cost of humidity sensor tag), $.4M for interoperability, and $3.1M for infrastructure (including surveys) will be required to outfit 72 aviation nodes with read, write, and interrogation capabilities.

The Savi Technology 654S sensor tag is being tested to address this humidity sensor requirement. The unit cost for these sensor-based tags has not been finalized. The total cost to deploy the equipment and AIS infrastructure needed to support this program is estimated to be $4.5M.

- **Ordnance**

The DoD policy directs the DoD suppliers to commence attaching pRFID tags to ordnance items being delivered as of January 2006. There is a caveat in the policy that anticipates the need to obtain proper certification that the passive tag equipment is safe to be used in the vicinity of some forms of ordnance. Readers for aRFID tags transmit less RF energy to communicate with aRFID tags since the tags carry their own battery power and do not have to be energized by a remote reader. Hence, if pRFID certification cannot be obtained, then the only safe RFID option would be to apply some variant of the aRFID tag on all or selected items. The Navy is currently studying the use of active tagging for all forms of ordnance. Navy is using active tags for ordnance shipping in container configurations for ITV.

As a result of the large number of primary and secondary ordnance logistics sites and the significant standing ordnance inventory, the active tag requirement is the single largest portion of the Navy's total active tag requirement. Hence, with over $30B of ordnance in the Navy's stockpile and hundreds of storage facilities worldwide, the ordnance total outfitting requirement equals $30.7M. If a positive ROI can be achieved by tagging all ordnance (including cases and pallets) with active tags, then $30.7M will be addressed in the POM 08 process. Navy is also investigating the capability of active tags to monitor (or sense) additional conditions (e.g., temperature, humidity, shock) and to track material in containers via satellite.

- **Navy Exchange**

Some portions of the Navy supply chain are special cases falling outside normal sustainment infrastructures. The Navy Exchange Service Command (NEXCOM) operates three CONUS distribution centers and seven overseas warehouses that build and/or receive container load shipment units. NEXCOM material does not pass through a Defense Logistics Agency facility. However, NEXCOM has embarked on several initiatives to optimize their supply chain, and will comply with the guidance in this plan for both pRFID and aRFID use in the shipment and receipt of its material using pallets and shipping containers both in and outside of CONUS.

NEXCOM stuffs and ships 10,000 seavan containers from CONUS to OCONUS to support retail store operations worldwide. This shipping system is closed loop (from NEXCOM shipper to receiver) with no in-transit stripping of containers. NEXCOM maintains excellent

internal ITV of container contents with internal AISs. However, to comply with CENTCOM active tagging requirements, NEXCOM partnered with FISC Norfolk who developed a manual process to tag the low volume of containers shipped to CENTCOM AOR. In order to comply with DoD RFID guidance for other AORs, the requirement to RFID enable the NEXCOM shipments are included in this plan. The Navy must develop the means to automate tag write from data found only in NEXCOM's internal systems. The cost associated with AIS enhancements is estimated to be $200K. The initial bulk procurement cost for tags is $500K. Cost to outfit export distribution operations is estimated to be $500K. The current estimate of initial outfitting costs is $1.2M.

6. Infrastructures and System Maintenance.

Navy will establish an MOA with PM J-AIT in order to gain efficiencies through combining Army and Navy requirements for surveys, outfitting, maintenance, and training of personnel through the FYDP.

2.3   Updates to aRFID funding requirements.

Data rich aRFID tags contain valuable content level detail that can be used at multiple points along the supply chain to improve logistics processes. Although the requisition number and/or Transportation Control Number (TCN) can often be used to query the Global Transportation Network (GTN) to identify the location of material/cargo as it moves through the strategic pipeline, the content detail provided on the tag ensures maximum benefits can be achieved in last mile tactical operations.

Much of the benefit of active tagging to Navy/DoD is contingent on supply and transportation system interfaces required to automate tag write and read events. An initial estimate of $690K was identified to cover ITV interoperability costs however, we have found that increases to enhance AIS interoperability can reduce other infrastructure costs such as need for additional software so we have updated projected costs in this area in Table 2.2. As additional Navy interoperability costs are identified, the plan will be updated to reflect these fluctuations.

Also, if a positive ROI can not be achieved by tagging all ordnance (including cases and pallets) with active tags, then the $30.7M ordnance requirement will not be addressed in the POM 08 process.

2.4   Summary

The Navy has invested in and taken action to support COCOM requirements, and is in the process of deploying aRFID to non-self deployers, Navy contingency sites, and shore activities to support these requirements. Navy will continue to support COCOM and Navy requirements for TAV/ITV and will pursue the execution and revision of this active plan to support current DoD RFID policy and future requirements.

Table 2.2 - Navy Active RFID Requirements Summary

RFID Capability for:	Initial Outfitting				Initial Outfitting Costs				LCM Costs				
Fleet and Components	**Equip**	**Tags**	**Surveys**	**ITV Int**	**FY05**	**FY06**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**
NOLSC Contingency Pool	$162	$140	$0	$0	$254	$48	$0	$0					
Standby Deployment Kits	$144	$28	$0	$0	$100	$72	$0	$0					
Fleet/Strategic Dist Nodes	$0	$0	$271	$0	$151	$120	$0	$0					
Non-self Deployers/EXLOG													
ELSF/SPECWAR/Other	$530	$482	$300	$100	$0	$871	$390	$151					
SeaBees/NCF CESE	$742	$857	$200	$100	$402	$824	$0	$673	**MOA WITH PM-JAIT**				
Fleet Hospitals	$68	$280	$100	$0	$448	$0	$0	$0	**For Savi Infrastructure**				
Miscellaneous													
Afloat	$0	$0	$157	$0	$37	$120	$0	$0					
NMCI Certs	$0	$0	$0	$160	$0	$160	$0	$0					
Hero Certs/Tests	$0	$0	$0	$180	$0	$180	$0	$0					
ECPs for Layer IV Containers	$0	$0	$0	$348	$348	$0	$0	$0					
Other Navy Requirements													
Engines/Dynamic Comp	$2,600	$1,000	$460	$350	$955	$1,715	$0	$1,740					
NEXCOM	$280	$500	$220	$200	$0	$390	$0	$810					
Totals													
Outfitting Totals	**$4,526**	**$3,287**	**$1,708**	**$1,438**	**$2,695**	**$4,500**	**$390**	**$3,374**	**$0**	**$0**	**$0**	**$0**	**$0**
Life Cycle Maintenance/Training							**$200**	**$400**	**$590**	**$590**	**$590**	**$590**	**$590**
Ordnance								**$7,260**	**$6,800**	**$5,000**	**$3,400**	**$3,900**	**$4,300**
TOTAL Requirements	**$4,526**	**$3,287**	**$1,708**	**$1,438**	**$2,695**	**$4,500**	**$590**	**$11,034**	**$7,390**	**$5,590**	**$3,990**	**$4,490**	**$4,890**
PDM2 Funding						$4,500	$590	$590	$590	$590	$590		
Unfunded						$0	$0	$10,444	$6,800	$5,000	$3,400	$4,490	$4,890
POM 08 Cumulative								**$10,444**	**$17,244**	**$22,244**	**$25,644**	**$30,134**	**$35,024**

Notes:
 - **ITV Int = Costs for AIS Enhancements/Approvals Needed to Automate Tag Write**
 - **ECPs = Engineering Changes for Affixing Tags Permanently on Layer IV Containers**
 - **Ordnance Costs Relate to Inventory Management Requirements (Not COCOM Requirements)**

3.0 Navy Passive RFID Implementation Plan

3.1 Program of Record

The DoD RFID policy requires that pRFID tags must begin to be applied to specific classes/commodities, location and layers of packaging commencing January 2005. Since the requirement was specified in FY04, an implementation in FY05 is outside the normal budgetary processes. As such, extraordinary funding measures would have to be taken to fully comply with deploying the initial passive infrastructure to be able to effectively read and pass the collected tag data to Navy AISs that have not yet been modified to accept them.

Pending the reconciliation of the current funding requirements with the available budget, the Navy has prepared the following interim budgetary plan to establish an appropriate infrastructure that will adhere to the DoD pRFID implementation timeline as closely as funding availability will allow.

If the "central management" concept is followed then the Navy AIT Program Office, via NAVSUP HQ, will budget and POM for all requirements to meet the plan requirements. The Resource Sponsor, OPNAV N41, will review and approve requirements, and forward for consideration in the development of the Navy budget.

Navy units/activities will be responsible for budgeting additional and future requirements over and above these outfitting costs. With no pRFID funding available in FY07, the current pRFID funding plan calls for a POM08 requirement (FY08-FY13) of $188.7M. An additional $279.9M is required to complete all requirements. See Table 3.1 below.

Table 3.1 - Passive RFID Funding Plan ($M)

Passive	2007	2008	2009	2010	2011	2012	2013	Remaining	Total
POM	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Ashore Requirement	$0.0	$3.7	$15.7	$22.8	$21.2	$11.7	$16.4	$87.5	$179.0
Afloat Requirement	$0.0	$3.4	$12.8	$13.0	$18.0	$24.1	$25.9	$192.4	$289.6
Total Passive	**$0.0**	**$7.1**	**$28.5**	**$35.8**	**$39.2**	**$35.8**	**$42.3**	**$279.9**	**$468.6**
Cum POM08 Requirement		$7.1	$35.6	$71.4	$110.6	$146.4	$188.7		

3.2   Execution

The Navy AIT Program Office is responsible for the execution of this plan. The Navy is currently engaged in two important pRFID initiatives including:

a. The focused implementation at TRF Bangor, Washington (BRE) that is focused on receipt processing at an organic repair facility.
b. The Navy Value Chain Prototype, which is focused on the use of pRFID afloat.

TRF Bangor: The Fleet and Industrial Supply Centers (FISCs) retail customers have an operational need for a standard warehouse management system that is robust, efficient, and includes the enhanced functionality to include RFID/AIT technology. The TRF Bangor initiative uses pRFID to enhance the supply processes at the Trident Refit Facilities warehouse and the Trident Intermediate Maintenance Facility (IMF). The application of pRFID is expected to significantly enhance the following processes: Receipt to Stow (Stock), Warehouse Refusal, Inventory Accuracy, and Customer Wait Time.

The objectives for this implementation are to: 1) improve inventory accuracy, 2) improve current warehouse management capabilities, and 3) meet the DoD mandated pRFID requirements in this segment of the Navy's supply chain.

Navy envisions the TRF Bangor solution to serve as a template to be inserted in the following 12 systems for the receiving, stowing, and issuing functions

Integrated Logistics Support Management Information System (ILSMIS)
Material Access Technology (MAT)
Manufacturing Resource Planning II (MRP II)
Naval Air Station Relational Supply (NAS R-SUPPLY)
Naval Construction Force Management Information System (NCFMIS)
Navy - Enterprise Resource Planning (N-ERP)
Real-time Outfitting MIS, Material Management System (ROMIS MMS)
Real-time Reutilization Asset Management (RRAM)
Relational Supply Force (R-SUPPLY FORCE)
Supply Inventory Management System (SIMS)
Trident Logistics Data System (TRIDENT LDS)
Uniform Automated Data Processing System for Stock Points (U2)

Navy Value Chain Prototype: The Navy views the potential benefits of pRFID deployment in the context of a "value chain". Figure 3-1 represents the basic flow of material and the constituent nodes. Creating value along this chain will be a product of the appropriate integration of pRFID technology, along with the re-engineering of the current business processes to maximize the beneficial effects. This initiative demonstrated that the Navy logistics/supply chain could integrate pRFID, as defined by DoD policy, into the current AISs that constitute the logistics chain such that the Navy can take advantage of the efficiencies offered by pRFID on Navy ships.

The shipboard implementation of the Value Chain Prototype project was based on a scaled-down version of the Smart Stores system CONOPS. The first prototype consisted of a one-week experiment conducted on board the USS NASSAU (LHA-4). The software core of this prototype will be a scaled down version of the Integrated Visibility Manager (IVM) that will be referred to as "IVM Lite".

Navy is building IVM to act as a front-end for the supply afloat application, food service application and retail stores, to avoid modifying these afloat applications to receive Advanced Shipping Notices (ASNs), and to read pRFID tags and match them up. IVM will accomplish these, thus minimizing the changes Navy will need to make to the associated afloat AISs, including R-Supply, Shipboard Warehouse Management System (SWMS), Food Service Management System (FMS), Retail Operations Management (ROM II), and others.

IVM correlates the RFID data to the information contained in the ASN, processes the ASN and Electronic Data Interchange (EDI) transactions, relays appropriate information to relevant AIS's, and informs users of the appropriate stowage locations for the received material.

Data collected and lessons learned are being assessed for future use in determining the best afloat implementation methodology for pRFID.

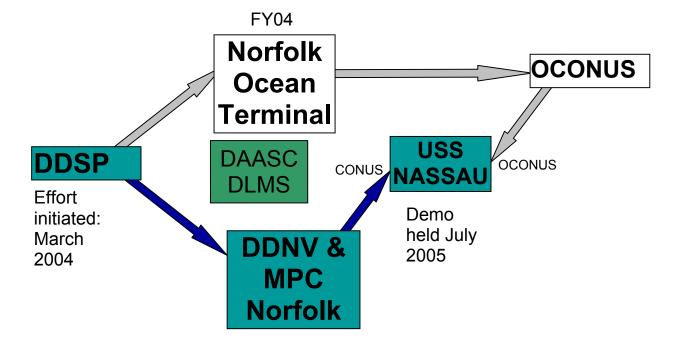A high-level depiction of the Value Chain Prototype process flow is provided below in Figure 3.1.

Figure 3.1 – Navy Value Chain Prototype

Infrastructure Build Out: The infrastructure build out and other preparations to provide the Navy pRFID capability will be accomplished using the following approach.

The Navy will focus on implementations with the highest likelihood of value (ROI) to Navy logistics, including the AISs which are used within organizations that are significant receivers of material shipped from the two Defense Distribution Centers (DDCs) that have been designated as the initial passive tag application sites (e.g., San Joaquin and Susquehanna).

The first AISs to be RFID-enabled are Uniform Automated Data Processing System (U2) and LCAV. See Table 3.2 for the entire list of AISs that have been identified to date.

Additionally, the Navy will:

a. First equip ashore locations that receive the greatest volume of material from the two CONUS DDCs that will be tagging at the point of origin.
b. Then equip the most active nodes immediately down stream from these high volume nodes.
c. Subsequently equip key ashore nodes in a logical order based on the geographic collocation of logistics sites that share common support AISs. Co-located sites can most cost effectively have their AIS's upgraded during the same evolution.
d. Concurrently with the ashore infrastructure build out, selected afloat/operational units will be outfitted with RFID capability. These afloat/operational units that provide supply support to other operational units are the highest priority. For example, aircraft carriers provide support for their embarked air wing, L-deck ships provide support for their embarked Marine Expeditionary Unit (MEU), and Logistics Support Ships provide supplies to other ships during underway replenishment.
e. Once the key ashore and afloat units are outfitted, and necessary funding is obtained, remaining organizations will be equipped with at least minimum capability (e.g., sufficient handheld readers to conduct routine supply transactions, along with the appropriate interfaces to the designated RFID-enabled supporting AISs).

With respect to AIS modifications, this plan includes funding for only the initial pRFID insertion and subsequent AIT hardware refreshment. AIS owners will be responsible for Life Cycle Maintenance of their systems.

1. Outfit Ashore Commands

Ashore outfitting will be scheduled to most cost effectively install equipment and modify each command's suite of AISs that must be RFID-enabled in the general sequence indicated by the approach described above. Consideration will be given to including geographically co-located organizations, regardless of relative priority. See Table 3.5 "Ashore Deployment Plan" at the end of this pRFID Implementation Plan section.

2. *Outfit Afloat Commands*

Afloat deployment will begin with the approximately 67 ships that provide material to embarked or battle group operating forces. As funding is available, the other Fleet forces will be outfitted with at least a minimum capability to read pRFID in the receipt process.

Due to the planning challenges already outlined, the implementation of pRFID to all sites ashore and afloat could take up to 12 years to complete. See Table 3.6 "Afloat Deployment Plan" at the end of this pRFID Implementation Plan section.

Consideration will be given to providing preliminary guidance to current ship acquisition programs, as well as early design phased programs. The Navy AIT Program Office will coordinate with platform Program Executive Offices (PEOs) to ensure that future ships have a configuration that can effectively accommodate RFID, and other AIT media expected to be in existence for the next decade and beyond. PEOs will budget and POM for implementation of RFID on new construction vessels. The Navy AIT Program Office will POM for all pRFID middleware, hardware, implementation costs and technology refresh for all ships "in service" at the beginning of FY08. Funding for new platforms that are already passed the budgeting point in the process has not been specifically included in this plan. However, planned decommissionings have also not been factored into the plan, and from a budgeting standpoint, these should roughly offset the cost for new platforms past their budgeting point. The Navy AIT Program Office will work these issues with the respective PEO as the situation arises.

The plan will be updated as ship decommissioning schedules are established. Additionally, operational units scheduled for decommissioning within three years after funding is available will be provided only a minimum portable capability to read pRFID.

3.3 AIS Interfaces and Modifications

The AISs listed in Table 3.2 have been designated as those that potentially will benefit from pRFID enablement.

Table 3.2 – AIS Site Summary

SYSTEM ACRONYM	SYSTEM NAME	Number of Sites
BLITS	Base Level Item Tracking System	4
CAV II	Commercial Asset Visibility II	300
CAV-ORM	Commercial Asset Visibility-Organic Repair Module	8
eRMS	Electronic Retrograde Management System	76
FSM	Food Service Management	90
HSMS/RHICS	Hazardous Substance Management System/Regional Hazardous Inventory Control System	116
ILSMIS	Integrated Logistics Support Management Information System	9
ISSMIS	Interim Supply Support Management Information System	2
LCAV	Logistics Support Center Customer Asset Visibility	15
MAT	Material Access Technology	4
MRP II	Manufacturing Resource Planning II	3
NAS R-SUPPLY	Naval Air Station Relational Supply	14
NCFMIS	Naval Construction Force Mgmt Information System	2
N-ERP*	Navy - Enterprise Resource Planning	6
ORCAS	Outfitting Requisition Control Accounting System	0
ROM II	Retail Operations Management II	2
ROMIS MMS	Real-time Outfitting Management Information System Material Management System	16
RRAM GOLD	Real-time Reutilization Asset Management	16
R-SUPPLY FORCE	Relational Supply Force	15
SIMS	Supply Inventory Management System	5
TRIDENT LDS	Trident Logistics Data System	0
U2	Uniform Automated Data Processing System for Stock Pts.	39
TOTAL		742

Table 3.2 Note: * Includes six sites currently running NEMAIS. Remaining N-ERP sites are counted under their current legacy system.

CDMD-OA is the Navy's shipboard equipment configuration master database, and as such, will not be fed RFID-based data at this time. Hence, no costs have been identified.

In calculating the costs for creating the necessary changes for N-ERP, Navy only included the cost of the hardware, implementation, and technology refresh. The cost of modifying the AIS is to be covered by N-ERP. These targeted sites are only the sites currently running NEMAIS. All other 'to be' N-ERP sites are included in this Plan under their current legacy AIS.

Also, in determining costs, the five sites currently running GOLD are scheduled to migrate to RRAM so those sites and the costs associated with them have been included under RRAM. Similarly, the four sites currently running SUADPS are migrating to RSupply Force, so those sites and the costs associated with them have are included under RSupply Force.

Although included in the original Plan, ORCAS has been removed from the plan, because ORCAS does not involve the receiving process.

ROLMS is the Navy's retail ordnance database that is being incorporated into the more comprehensive Ordnance Information System. (OIS). Since the Navy is pursuing an aRFID solution, a pRFID interface is not currently planned.

As part of the BRE at Bangor TRF, Navy realized that the receiving process could be re-engineered and standardized between Trident LDS and U2. Hence, the required Trident LDS changes have been included as part of the U2 costs to implement BRE and the remaining Trident LDS site is included under U2.

3.4 Configuration

The Navy has developed a configuration matrix of six variations of ashore and six variations of afloat units, each with its own equipment suite that best matches the size and complexity of the organizations or operating units physical layout for material management/logistics operations. Columns A, B, and C in Table 3.4 are the same for cost purposes only, and will be revised when more refined configurations can be determined by NAVSEA.

The ashore sites have three categories with varying numbers of handheld readers. The other three categories have a combination of fixed doors and handheld readers, again varying by size and complexity of the site. See Table 3.3 below.

Table 3.3 – Ashore Configuration Variants

Configuration		Handheld Only			Fixed Doors and Handheld		
		A	B	C	D	E	F
Inputs	Handhelds	2	4	6	6	12	18
	Industrial PCs	1	2	3	1	2	3
	RFID Printers	1	1	2	1	2	2
	Doors				2	3	4
	Palletization St				1	2	3
	Forklifts				0	1	2
	Overhead Scan				0	0	1
Derived	Access Pts.				3	6	9
From	Motion Sensors				3	5	7
Inputs	Reader Cont.				4	8	12

The following afloat configuration table is displayed in categories by ship class or a group of similar ship classes.

Table 3.4 - Afloat Configuration Variants

Configuration	CVN	AS	LHA/ LHD/CLF	LPD/ LSD	Subs	All Others
	A	B	C	D	E	F
Stationary Reader (multi-RF read)	6	6	6	6		2
General purpose UHF Antenna	12	12	12	12		4
Bar Code scanner	0	0	0	0		0
Light/status bar	6	6	6	6		2
Rugged e-tabulate	24	24	24	24		8
Handheld Reader (multi-RF read)	34	34	34	12	4	8
Access point	5	5	5	3	1	1
pRFID Printer	5	5	5	3	1	1
Management servers	2	2	2	2	2	2
LAN drops	14	14	14	12	5	5

3.5   Ordnance

The DoD RFID policy directs the DoD Suppliers to commence attaching pRFID tags to ordnance items being delivered as of January 2006. However, there is a caveat in the policy that anticipates the need to obtain proper certification that the passive tag equipment is safe to be used in the vicinity of ordnance. Therefore, this plan assumes the use of aRFID tags with ordnance, assuming an ROI is demonstrated.

3.6   Summary

The Navy has invested in and taken action to support the DoD RFID guidance. Navy will continue to evaluate and update this plan accordingly. However, pRFID execution efforts are subject to a number of issues previously outlined in reference (b), including funding. We have conducted a BCA to help identify potential cost savings and ROI to assist in making future investment decisions regarding RFID. This report was completed in April 2005 to support our PR07 efforts. A copy of the Navy BCA was provided to OSD. This plan provides the Navy a framework to work towards, and is subject to change.

Table 3.5 - Ashore Deployment Plan (Systems)

AIS	Sites	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
BLITS	4				1	3				0	0			4
CAV II	300					1	19	20	20	20	60	60	100	300
CAV ORM	8				1	3	4							8
C-ERP	6				6									6
eRMS	76					1	14	15	15	16	0			76
FSM	90					5	5	5	5	15	15	15	25	90
HSMS/RHICS	116										30	30	56	116
ILSMIS	9						2	3	4					9
ISSMIS	2								1	1				2
LCAV	15			1	4	8	2							15
MAT	4					1	3							4
MRP II	3				1	2								3
NAS R-SUPPLY	14				1	3	5	5						14
NCFMIS	2						1	1						2
ROM II	2					2			0					2
ROMIS MMS	16						1	7	8					16
RRAM/GOLD	16					1	3	4	4	4				16
R-SUPPLY FORCE	15					1	4	4	4	2				15
SIMS	5								1	4				5
U2	39	1		12	14	12								39
Total	742	1	0	13	29	56	64	64	62	62	105	105	181	742

Table 3.6   Afloat Deployment Plan (Ships)

Ship Type	#	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Remaining	Total
AGF	2									1	1			2
AOE	1						1							1
AS	2							1	1					2
CG/CG71	24									3	3	3	15	24
CVN	12			2	2	2	2	2	2					12
DD/DD(X)	4										1	1	2	4
DDG	50									2	8	5	35	50
FFG	30									3	4	5	18	30
LCC/LCS	4			2						1	1			4
LHA / LHA-R	5						1	2	2					5
LHD/LHD8	8			1	2	3	2							8
LPD/LPD17	10						3	3	4					10
LSD	12				2	2	2	3	3					12
SSBN	18									2	2	2	12	18
SSN	53									4	4	6	39	53
T-AGS/T-AGOS/T-ATF	9									3	3	3		9
T-ARS/T-AKR	23							3	3	3	3	3	8	23
T-AH	2							1	1					2
T-AKE(XT-AFS / XT-AE)	12			2	2	3	2	2	1					12
T-AO	14				3	3	4	4						14
T-AOE	4				1	1	1	1						4
Total	299			7	12	14	18	22	17	22	30	28	129	299

Footnote: The following platforms will not be "in service" in FY08, and therefore are not reflected in the plan at this time: LMSR, MLP, JHSV, CVN-21 and FSS.

27

4.0   Navy Active and Passive RFID Container Initiatives

Navy is actively engaged in several container initiates integrating aRFID and pRFID as well as other AIT media. These initiatives cross many functional areas to support asset visibility, both in-transit and in-storage, as well as inventory management and are discussed below.

FISC Norfolk Ocean Terminal Container Operations

This project increases manifest accuracy and inventory accountability at FISC Norfolk Ocean Terminal Division Container Freight Station using pRFID tags. The project mitigates the number of errors introduced into the process by existing manual cargo checking procedures and increases the speed and efficiency of the checking process. Passive RFID tags are introduced into the business process for stuffing SEAVAN containers. Phase 1 positioned/installed ePC tags used to document container contents. Phase 2 integrated pRFID-enabled receipts, ePC tags, used to receive shipments from DDSP. Future passive and active integration will support DoD efforts to nest pRFID within aRFID to automate container content visibility. Business processes must continue to be studied and redesigned in order to capture those improvements in operational efficiency that can lead to the reallocation of manpower.

Navy Medical Pack Up Kits (PUKs)

The Navy Medical Pack Up Kit (PUK) project at Fleet Hospital Support Office (FHSO) Cheatham Annex establishes and maintains visibility of medical equipment that provides life-saving and critical services (twelve surgically intense medical procedures) to include casualty receiving, an intensive care/medical-surgical unit, operating rooms, a laboratory and a radiology unit. AIT facilitates rapid part location within both warehoused and deployed Emergency Medical Units (EMUs). Phase 1 culminated in an EMU mobilization, transport, and deployment demonstration via the Navy's new High Speed Vessel (HSV) and the 463L pallets. The demonstration shows how centralized asset management and "on-demand" mission specific EMU deployment, using multiple AIT/RFID technologies can be applied to mobile hospital modules and components to provide greater flexibility, increased readiness, and immediate use of EMU upon deployment. Multiple technologies are used with component parts/packages labeled with linear and 2D barcodes, passive and semi-active RFID tags, along with CMBs. The project successfully created and captured essential data, passing and viewing the same data during buildup, assembly, maintenance, deployment, recovery, teardown and reconstitution processes. The project also completed AIT integration with Defense Medical Logistics Standard Support System (DMLSS) for batch processing, deployed EMU Delta marking over 13,000 items of equipment, tracked equipment convoy using Iridium Modem with GPS, and achieved $500K savings per deployment in reduced transportation costs.

NFELC Smart Container

NAVFAC/NFELC, as the TOA manager for Seabees, has expressed interest in a "smart container" project. The Seabees are currently writing "As-Packed" container commodity data on aRFID tags to streamline location and identification of containerized material in support of a mission. The Seabees are exploring the use of pRFID to populate the commodity data written to

the aRFID tag, as well as to automatically record and manage the container inventory. This would permit more effective supply inventory management while streamlining the containerization process. It would also permit more efficient integrated logistics overhaul of containerized assets supporting deployed Seabees and MPF operations.

Naval Aviation Pack Up Kits (PUKs)

The Naval Aviation PUK project maintains accountability and manages transfer of PUKS. The PUK project provides a test-bed for "live experimentation" with emerging technologies including RFID, UID, SNT and SAP integration. The goals are to gain an understanding of the technology, review and evaluate commercially available technologies, share experiences, and information with other DoD Supply Chain Managers, and establish realistic ROI for the processes. Benefits include automatic inventory counts with associated labor savings, and increased readiness through more timely tracking of assets. Deliverables include developing AIT competencies and implementing total asset visibility technology. ROI to be achieved includes both efficiencies gained and the value-added to operations. Active and passive tags will be integrated with Global Container Communications. The Navy is anticipating 7000-8000 man-hour savings per PUK/yr with an associated 50% warehouse footprint reduction. This capability can also be expanded to LCACs, Seabees, and SPECWAR operations, to Military Sealift Command (MSC) platforms, including T-AFS, T-AOE, T-AE, and T-AKE, as well as to Humanitarian Assistance programs.

Summary of Actions

Section Page #	Action	Lead Organizations	Coordinating Organizations	Completion Date
1.3 Page 2	RFID hardware and unique software requirements shall be identified for all commands and submitted to Navy AIT Program Office when identified.	Navy Echelon II Commands	Navy AIT Program Office	Continuing
1-3 Page 3	Search for ITV gaps and will identify future investment requirements accordingly.	Navy TAV Office	Navy AIT Program Office	Continuing
1.5 Page 4	Assist OPNAV, and OSD Supply Chain Integration and RFID Office's working groups to resolve issues and determine appropriate courses of action.	Navy AIT Program Office	Navy AIT Program Office	Continuing
1.9 Page 7	Report plan implementation progress measurements semiannually to the Navy AIT Program Office.	Navy Echelon II Commands	Navy AIT Program Office	Semi-annually as directed
1.9 Page 7	Develop detailed progress reporting guidance.	NAVSUPSYSCOM	Navy AIT Program Office	4th QTR FY06
1.9 Page 8	Adopt specific measurement metrics	NAVSUPSYSCOM	Navy AIT Program Office	Continuing
1.10 Page 8	Coordinate with the Navy AIT Program Office when taking significant action in response to the plan requirements, particularly when developing or upgrading AISs that will be RFID-enabled.	Echelon II Commands and AIS Owners	Navy AIT Program Office	Continuing
2.2 Page 13	Conduct liaison with Hardware Systems Commands (HSCs), PM J-AIT, supporting vendors and activities/units to coordinate efforts to equip in support of the ITV effort	NOLSC/NAVSUP	Navy AIT Program Office	Continuing